

II. AMENDMENTS TO THE CLAIMS

- *PLEASE FIND BELOW A MARKED VERSION OF CLAIMS WITH PRESENT STATUS DELINEATED*
 - *THE CLAIMS ARE HEREIN AMENDED, CANCELED, OR ADDED TO, SO AS TO EVENTUATE IN THE NEW SET OF PENDING CLAIMS INDICATED BELOW. THIS LISTING OF CLAIMS WILL REPLACE ALL PRIOR VERSIONS AND LISTING OF CLAIMS IN THE APPLICATION.*

Claims are shown on next page.

1.-39. (CANCELLED)

40. (PREVIOUSLY PRESENTED) The method of claim 48, wherein the signal is derived through a computer-aligned plurality of microscope objectives from a large field sample.

41. (PREVIOUSLY PRESENTED) The method of claim 48 , wherein the rare cell is present at a concentration of 0.001%, 0.0001%, 0.00001%, or 0.000001%.

42. – 44. (CANCELLED)

45. (CURRENTLY AMENDED) A computer software product for use in a computerized microscopic vision system comprising a computer-readable storage medium containing a sequence of computer-directed steps to identify automatically a rare cell image, in accordance with the method of claim 48.

46. (CANCELLED)

47. (CURRENTLY AMENDED) A method for rare cell bright field and fluorescence microscopic image detection and identification, comprising the computer implemented automatic motorized steps of:

(i) locating and digitizing a bright field and fluorescence microscopic image of a rare cell candidate or a cell blob containing a rare cell candidate on a sample slide transported from a storage module on to a microscope stage with a microscope objective and digitally recording and stor[[e]]ing x and y coordinates as well as focal y-z coordinates thereof, starting from, and relating to, a position at a point of origin (x₁,y₁) of an optical field;

(ii) detecting by pre-set criteria according to cell size, cell morphology, and characteristic cell markers the digitized image of a rare cell candidate, or a cell blob containing a rare cell candidate, or rare cell candidate nucleus,

(iii) identifying said detected rare cell candidate image by locating with a sensor a motorized and computer-controlled tagging or labeling reagent dispensing system over said rare cell candidate image according to the x, y and y-z position coordinates to apply automatically and selectively one or more specific tag or label to said rare cell candidate image *in situ*, and

(iv) transporting the sample slide to the storage module.

48. (CURRENTLY AMENDED) A method for detecting a cell deposited on a microscope slide and labeled with a detectable label performed using a computerized microscope system having a stage for holding said microscope slide, a microscopic vision module for detecting a signal indicative of the presence of a labeled rare cell, or a blob comprising a labeled rare cell, on the microscope slide having a transporter thereof from a storage module, and for recording the position coordinates of said rare cell, or said blob comprising said labeled rare cell in an optical field, a processor configured, based on data pertaining to the position coordinates of said rare cell or said blob comprising said labeled rare cell, to provide instructions to locate a reagent dispenser at the position coordinates of a signal indicative of the presence of said labeled rare cell, or said blob comprising a labeled rare cell, and to cause said reagent dispenser to dispense a volume of material, said method comprising the steps of:

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(i) automatically locating in an optical field a rare cell candidate, or a cell blob comprising a rare cell candidate, by determining correspondence of digitized optical properties in an optical field with predetermined data indicative of said labeled rare cell;

(ii) automatically recording coordinates of said rare cell candidate, or said blob comprising said labeled rare cell, in the optical field;

(iii) automatically locating said reagent dispenser over said rare cell candidate, or cell blob comprising a rare cell candidate, based on one or more set of said position coordinates; and

(iv) automatically dispensing reagent from said reagent dispenser onto said rare cell candidate, or said blob comprising said rare cell candidate, and

(v) transporting the sample to the storage module.

49. (PREVIOUSLY PRESENTED) The method of claim 48 wherein said reagent dispensed at step (iv) is at least one material selected from the group consisting of: a label, PCR material, and a primer.

50. (PREVIOUSLY PRESENTED) The method of claim 48 wherein said reagent dispenser of said computerized microscope is interfaced with a motor such that it can move with respect to said stage.

51. (PREVIOUSLY PRESENTED) The method of claim 48 wherein said stage of said computerized microscope is motorized to move with respect to such reagent dispenser.

52. (PREVIOUSLY PRESENTED) The method of claim 48 further comprising after step (iv), a step (v) comprising moving said slide to a thermocycling station.

53. (PREVIOUSLY PRESENTED) The method of claim 48 wherein the reagent dispenser of said computerized microscope comprises a sensor for locating position with respect to said microscope slide or microscope stage.

54. [[53.]] (CURRENTLY AMENDED) The method of claim 48 wherein the reagent dispenser of said computerized microscope comprises a pump for delivering reagents from a reagent reservoir.

55. (NEW) The method of claim 48 wherein the microscope slide transporter of said computerized microscope comprises at least one sensor for locating position with respect to said microscope slide or microscope stage or storage module.